APPENDIX M-3.

Renal Analysis Tables
Occupation and Diabetic Class Removed from Final Model

This appendix contains results of exposure analyses after occupation or diabetic class has been removed from those final dioxin models (Models 2 through 6) that contained occupation or diabetic class. These analyses are performed to investigate the relationship of the dependent variable to dioxin without adjusting any effects due to occupation or diabetic class. The format of these tables closely parallels the adjusted panels of Chapter 17 tables. A summary of the tables found in this appendix follows.

Appendix M-3 Table	Chapter 17 Table	Dependent Variable
M-3-1	17-3	Kidney Disease
M-3-2	17-4	Kidney Stones
M-3-3	17-5	Urinary Protein
M-3-4	17-6	Urinary Red Blood Cell Count
M-3-5	17-7	Urinary White Blood Cell Count
M-3-6	17-8	Serum Creatinine
M-3-7	17-9	Urine Specific Gravity

Table M-3-1.
Analysis of Kidney Disease
Occupation and Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	**n**	**Adj. Relative Risk (95% C.I.)[ab]**	**p-Value**	**Covariate Remarks**
Comparison	1,041			AGE ($p<0.001$)
Background RH	364	1.02 (0.73,1.42)	0.905	
Low RH	253	1.00 (0.69,1.45)	0.985	
High RH	256	1.17 (0.81,1.70)	0.393	
Low plus High RH	509	1.08 (0.81,1.44)	0.580	

[a] Relative risk and confidence interval relative to Comparisons.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-3-2.
Analysis of Kidney Stones
Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log_2 (Initial Dioxin)[a]			
n	**Adj. Relative Risk (95% C.I.)[b]**	**p-Value**	**Covariate Remarks**
520	0.65 (0.39,1.06)	0.061	AGE ($p=0.057$)

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[b] Relative risk for a twofold increase in initial dioxin.

Table M-3-3.
Analysis of Urinary Protein
Occupation and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
518	1.18 (0.87,1.59)	0.287	

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin.

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,062			AGE (p=0.012)
Background RH	374	1.28 (0.72,2.25)	0.401	
Low RH	259	0.64 (0.30,1.33)	0.230	
High RH	259	0.99 (0.50,1.92)	0.965	
Low plus High RH	518	0.80 (0.47,1.36)	0.407	

[a] Relative risk and confidence interval relative to Comparison.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-3-3. (Continued)
Analysis of Urinary Protein
Occupation and Diabetic Class Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	892	1.18 (0.94,1.49)	0.157	AGE*RACE (p=0.039)
5	892	1.16 (0.95,1.43)	0.145	AGE*RACE (p=0.035)
6[c]	891	1.15 (0.93,1.44)	0.203	AGE*RACE (p=0.036)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table M-3-4.
Analysis of Urinary Red Blood Cell Count
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,062			AGE (p=0.054) RACE (p=0.004)
Background RH	374	1.07 (0.47,2.47)	0.869	
Low RH	259	1.08 (0.43,2.73)	0.873	
High RH	259	3.39 (1.69,6.79)	0.001	
Low plus High RH	518	2.10 (1.13,3.90)	0.020	

[a] Relative risk and confidence interval relative to Comparison.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	892	1.18 (0.92,1.50)	0.197	
5	892	1.16 (0.93,1.44)	0.194	
6[c]	891	1.16 (0.92,1.46)	0.224	

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids.

Table M-3-5.
Analysis of Urinary White Blood Cell Count
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,063			AGE (p=0.040) RACE (p=0.069)
Background RH	374	1.03 (0.47,2.24)	0.947	
Low RH	260	1.34 (0.61,2.92)	0.467	
High RH	260	1.81 (0.85,3.87)	0.124	
Low plus High RH	520	1.55 (0.84,2.86)	0.160	

[a] Relative risk and confidence interval relative to Comparison.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	892	1.13 (0.87,1.47)	0.370	AGE (p=0.174)
5	892	1.10 (0.87,1.38)	0.430	AGE (p=0.186)
6[c]	891	1.15 (0.89,1.48)	0.278	AGE (p=0.153)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table M-3-6.
Analysis of Serum Creatinine (mg/dl)
Occupation and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[a]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	174	1.0286	0.012	-0.0069 (0.0069)	0.320	AGE (p=0.471) RACE (p=0.072)
Medium	173	0.9819				
High	173	0.9952				

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Slope and standard error based on natural logarithm of serum creatinine versus log_2 (initial dioxin).

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,063	1.0051			AGE*RACE (p=0.033)
Background RH	374	0.9992	-0.0058 --	0.561	
Low RH	260	1.0178	0.0127 --	0.274	
High RH	260	0.9977	-0.0073 --	0.526	
Low plus High RH	520	1.0082	0.0031 --	0.761	

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on natural logarithm scale.

[d] P-value is based on difference of means on natural logarithm scale.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-3-6. (Continued)
Analysis of Serum Creatinine (mg/dl)
Occupation and Diabetic Class Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	1.0018 (295)	1.0158 (300)	1.0005 (299)	0.016	0.0033 (0.0043)	0.437	AGE (p=0.013) RACE (p=0.001)
5	0.9972 (300)	1.0144 (297)	1.0066 (297)	0.017	0.0039 (0.0037)	0.291	AGE (p=0.012) RACE (p=0.002)
6[d]	1.0001 (299)	1.0149 (297)	1.0054 (297)	0.016	0.0025 (0.0040)	0.525	AGE (p=0.014) RACE (p=0.002)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum creatinine versus log_2 (current dioxin + 1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table M-3-7.
Analysis of Urine Specific Gravity
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[a]			
Initial Dioxin	n	Adj. Mean[a]	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	173	1.0184	0.028	0.0003 (0.0002)	0.139	AGE (p=0.800)
Medium	173	1.0192				
High	172	1.0193				

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	Low	Medium	High	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
6	1.0180 (299)	1.0187 (296)	1.0194 (296)	0.008	0.0003 (0.0001)	0.027	

[a] Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

Note: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.